

Research proposal

Academic Focus and Research Rationale

The primary research question is ‘Does inclusion of sustainability topics, such as electrical waste, in the GCSE Computer Science specification affect young adults and their parent’s attitude and actions towards sustainability?’

The aims and objectives of the research are:

- To increase research into Computing and Sustainability education
- To establish if inclusion of sustainability topics into the GCSE Computer Science specification affects young adults and their parent’s attitudes towards sustainability

The research will take place within a UK Secondary school, Astrea Academy Sheffield within the only Y10 GCSE Computing class. The boundaries consist of that the population in this situation is 30 students, however nationally there are 79,135 students entered for the qualification (BCS, 2022) therefore this research could be repeated with a larger population.

There are many ethical considerations to consider, especially as the research involves children. This research will use The University of Wales Trinity Saint David Research Ethics and Integrity Code of Practice (2022) to guide the research.

There is very little existing research in the area of Computing and sustainability, therefore this research hopes to add to this specific area of research, and suggest further areas of research. The concepts and theories however that will inform my research include the model on Sustainability and Computing by Peters et al. (2023) alongside Fishers et al (2016)’s research on integration of sustainability into Computing education. Furthermore this research will utilise the growing research into action competence for sustainability, with work such as Kollmus and Agyman (2002)’s model which focuses on the relationship between environmental knowledge and pro-environmental behaviour.

Research Paradigm and Method

Identify the research paradigm you will use to research the topic

‘A paradigm is a basic belief system and theoretical framework with assumptions about 1) ontology, 2) epistemology, 3) methodology and 4) methods’ (Rehman and Alharti, 2016). There are three main research paradigms; positivism, interpretivism, and critical theory (Rehman and Alharthi, 2016). This research will use the critical theory approach. It is essential to choose an appropriate paradigmatic framework, as Guba and Lincon (1994) suggest, it ‘provides with the world of views that define the nature of the world as well as the range of possibilities for its holders

in relation to reality'. Critical theory is also 'an approach that goes beyond the traditional formulations of quantitative and qualitative research to explore and challenge the socio-historical constructs of knowledge production' (The University of Sheffield, 2023).

Identify the research methods that you will use to gather the data

Students and one adult at home will complete a short questionnaire prior to the teaching of sustainability. There will then be the standard teaching of sustainability topic 5.1.1 of the Edexcel Specification. There will be then a learning activity to be completed at home by the student and their chosen adult. Then a post learning questionnaire will be completed by the child and the same adult at home. Taherdoost (2018) argues that questionnaires are 'effective tools for data collection required research and evaluation'. Patten (2016) however, argues that one disadvantage of a questionnaire is that respondents often may be swayed by 'social desirability' meaning that 'they may give answers that they think are socially desirable, even if they are not fully accurate'.

A focus group will also be undertaken with chosen students to gain further qualitative data. Vaughn, Schumm, and Sinagub, (1996) suggest that 'the group format offers support for individual participants and encourages greater openness in their responses'. Schoenfeld, (1988) highlights that 'responses that are made may be more genuine and substantial'. The use of a focus group in this research project, therefore allowed 'the opportunity to elicit a range of opinions' (Byers and Wilcox, 1991). Wilkinson (1998) however argues that if 'the purpose of the research is to categorize or compare types of individuals and the views they hold, or to measure attitudes, opinions or beliefs, focus groups are less appropriate'.

Summarise the methodological limitations of the research

The methodical limitations of the research include that participation in the research by the students will be optional. These students are fourteen and fifteen years old, and their willingness to participate in master's project research may be low. There is also the additional difficulty that the students are forty-three percent English as a second language. Their parents also may have low levels of English literacy.

Data collection and analysis

Select the appropriate data collection techniques for your topic

Both Qualitative and quantitative data will be collected. Qualitative data can be defined as data that ‘explores and provides deeper insights into real-world problems’ (Moser and Korstjens, 2017). It can also be described more generally as data in the ‘form of words rather than numbers’. (Punch, 2013). Quantitative data will also be collected. Quantitative data is ‘data represented numerically, including anything that can be counted, measured, or given a numerical value’ (NNLM, 2023).

Both types of data will be collected with primary research via questionnaire. Primary research can be defined as ‘the collection of original data specific to a particular research project (Gratton and Jones, 2010). Students and their chosen adult will complete a questionnaire before in school education on sustainability topics surrounding Computing. They will then complete a learning activity at home based on the topics learnt in school, with their chosen adult. Both parties will then complete a post education questionnaire. There will also be a focus group with students, to gain further qualitative data after the education and questionnaires are complete, as detailed above

Identify the respondent population and sample if required

The respondent population is the Y10 GCSE Computer Science students at the secondary school Astrea Academy in Sheffield, UK. One hundred percent of this population is the intended source of data collection. This population is 30 students.

Explain how you will analyse the data collected

This research will use both Descriptive and Inferential statistics. Inferential statistics is ‘the drawing of inferences or conclusion based on a set of observations’ (Sutanapong and Louangrath, 2015). McGregor (2018) highlights how Descriptive statistics give detail about raw data. Descriptive statistical techniques such as bivariate analysis will be used to ascertain if there is a relationship between two variables (Kaliyadan and Kulkarni, 2019).

Specify the research limitations in terms of both reliability and validity

Validity can be described as ‘the closeness of what we believe we are measuring to what we intended to measure’ (Roberts and Preist, 2006). A limitation of this data collection in terms of validity is that the data collection will be from all GCSE Computer Science students at the school, which is a small population. This research could be repeated across the country, to improve its validity, as there are 79,135 students in the UK studying GCSE Computer Science (BCS, 2023), with all exam boards having some element of sustainability taught within the specification.

Reliability describes ‘how far a particular test, procedure or tool, such a questionnaire, will produce similar results in difference circumstances, assuming nothing has changed’ (Roberts and Preist, 2006). Reliability can be improved by good questionnaire design which will be discussed further in my main dissertation.

Resource and Time Management

The following time plan highlights the steps for the research. As this research is unsponsored, there are no relevant budget considerations to be made.

Year 1: September 2022 – July 2023											
Year 1	September	October	November	December	January	February	March	April	May	June	July
Planning	✓	✓	✓	✓							
Supervisor Meetings					✓						
Research proposal Submission					✓						
Pre-learning questionnaire data collection						✓					
Deliverance of sustainability scheme of work							✓				
Learning activity completed by students and chosen adult								✓			
Literature review						✓	✓				
Post-learning data collection								✓			
Focus group data collection								✓			
Draft submission										✓	
Writing final report						✓	✓	✓	✓	✓	✓

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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